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rate of pumping is satisfactory. If Venturi or other meters are in use, the meter reading may be made the basis for adjustment.

In gravity systems, where the fluctuations are greatest, the greatest difficulty arises. There is no simple method of adjusting the rate of dosage to the flow in such cases. Certain mechanical devices are obtainable for accomplishing this result and should be used whenever possible.

Desirable and even necessary as many of these requirements are it can not be too strongly emphasized that much can be accomplished in a short time and by simple home-made means.

A few barrels, some piping, a toilet flush tank, and some bleaching powder are all that are absolutely required. Pending the installation of a better plant, the water supply of any community can be absolutely safeguarded within a few hours after beginning work. These may be called the "first-aid" remedies, after which the question of securing the services of an experienced water-works engineer should properly come up for consideration.

THE SOURCE AND SUPPLY OF MEDICINES.

WITH SPECIAL REFERENCE TO THE INTERFERENCE CAUSED BY THE EXISTING EUROPEAN WAR.

By MARTIN I. WILBERT, Technical Assistant, Division of Pharmacology, Hygienic Laboratory, United States Public Health Service.

The European war has demonstrated as no other combination of circumstances possibly could the degree to which we in this country are dependent on Europe for the ordinary supplies of our drugs and medicines. This dependence has been particularly emphasized by the unprecedented increase in the price of some of the more widely used drugs and the practical exhaustion for the time being of some few of the more important articles of materia medica that are made or controlled in the European countries now at war.

Probably the chief reason for the rapid rise in values was the fact that the available stocks of many of the staple articles during the summer months are usually at a rather low level and that practically all of the great drug markets of the world are in the war zone, so that stocks on hand in these ports are not available for export, either because of blockade or because the local government has interdicted the exporting of drugs.

It is not generally known that by far the greater number of drugs sold in the different countries of the world are marketed through London, Hamburg, or Trieste. A few drugs, like the products of the Dutch colonies, are marketed through Amsterdam, and some of the

drugs produced in Turkey and western Asia come to us directly from Constantinople or Smyrna. The bulk of the drugs used, however, even those of American origin, is distributed from the great drug markets of the world in the cities mentioned above.

The greatest uncertainty in the American supply of drugs is in connection with what are commonly known as botanicals. During the summer months the available stocks of these drugs are usually at an exceptionally low level because of the fact that many vegetable drugs deteriorate more or less on keeping, and, of some at least, supplies are not kept over from year to year, the new crop of drugs being available for distribution late in the summer or early in the fall, just about the period in which the war had its origin. A few of these drugs, like digitalis, stramonium, dandelion, and burdock root have become acclimated in different sections of this country and would be available in large quantities for the gathering. Up to the present time, however, the price at which the foreign drug could be purchased was such that the margin of profit was not sufficiently great to warrant their collection.

Farmers' Bulletin No. 188, entitled "Weeds used in medicine," contains illustrations of a number of drug plants and the necessary directions for gathering and curing many of the now scarce drugs. This pamphlet is sold by the Superintendent of Documents, Government Printing Office, Washington, D. C., for 5 cents, and the directions given therein are sufficiently explicit to identify the plants and insure marketable products.

The greatest difficulty in securing supplies of drugs during the coming year will no doubt be encountered in connection with the so-called "synthetics," articles made directly or indirectly from coal-tar. Practically from its beginning this business has been monopolized by European manufacturers, largely because of the better equipment of their manufacturing establishments, and also because of the marked difference in the cost of labor. Even the simplest products, like benzol, aniline oil, carbolic acid, salicylic acid, and benzoic acid, are made almost exclusively in Europe, and the prices at which these several products are being held at the present time in this country is entirely out of keeping with their cost of production, were American manufacturers equipped with the necessary apparatus to make them. Benzoic acid, for instance, is being quoted at ten times the price at which it could be purchased two months ago, while salicylic acid commands five times the price and phenol ten times the price asked for them before the outbreak of the war. These inordinately high prices must be paid despite the fact that we in this country have unlimited amounts of the raw material and produce probably more coke than any other country in the world. Unfortunately but a comparatively small amount of this coke is now made in by-product plants because

of the limited market for the coal tar produced. Heretofore much of the domestic coal tar was sent to Europe to be manufactured there into phenol, aniline oil, benzol, toluol, and the thousand and one products made from them which in turn were sent back to us to buy at very much enhanced values. During the fiscal year ending June 30, 1913, the coal-tar products entered for consumption in the United States aggregated a total declared value at the port of entry of more than \$15,000,000.

An important branch of the drug and spice industry which has as yet not been developed to any appreciable extent in this country is the production of volatile oils, perfumes, and related products which in 1913 were imported to the value of nearly \$7,000,000. The prices asked for some of these products, even for the few oils made in this country, have advanced materially and it will be some months before normal conditions can again be brought about. Many of these oils could or should be produced in this country from materials imported direct from the East or West Indies and other tropical or subtropical countries not involved in the present war.

An interesting illustration of the need for establishing an independent source for products of this type is to be found in thymol. This article less than three months ago was quoted at the then rather high price of approximately \$2 per pound, while at the present time the price quoted is \$15 a pound with the available stock on hand practically exhausted. In a commercial way this substance is obtained principally from ajowan oil, the volatile product obtained from the seed of an umbelliferous plant in India. Thymol also occurs in the oils of horse mint, dittany, thyme, and wild thyme. Horse mint, *Monarda punctata*, is an American labiate that could be gathered in large quantities or cultivated, like peppermint or spearmint, for the economic production of thymol. For the immediate future, however, there is no good reason why ajowan seed should not be imported into this country directly from India and other countries where it is grown and thymol produced economically in sufficiently large quantities to supply the demand.

A few drugs and chemicals, notably the alkaloids, such as cocaine, morphine, and quinine, will of necessity be very widely used in the countries now at war, in the treatment of the sick and wounded, and this greater demand for these commodities will probably tend to prevent any decrease of their price to the normal in the near future.

The scarcity and accompanying increase in the price of drugs is, of course, only one of the many burdens that have been or will be imposed on us by the interruption of normal trade conditions, but this burden may have a redeeming feature in that it will teach us to exercise greater care in the use of these commodities, will tend to encourage their production in this country, and should suggest the

practicability of establishing for ourselves and for the American continent generally a distributing center for the drug products of the world that will be independent of the now existing drug markets in European ports.

PLAGUE-ERADICATIVE WORK.

CALIFORNIA.

The following report of plague-eradication work in California for the week ended September 19, 1914, has been received from Surg. Long, of the United States Public Health Service, in charge of the work:

SAN FRANCISCO, CAL.		RATS IDENTIFIED—continued.	
Number of premises inspected.....	1,431	<i>Mus alexandrinus</i>	80
Number of premises destroyed.....	8	<i>Mus rattus</i>	90
Number of nuisances abated.....	169	PORT COSTA, CAL.	
Number of poisons placed.....	22,900	Number of rats trapped in warehouses.....	19
Average number of traps set daily.....	1,734	Number of rats trapped on water front.....	15
RATS COLLECTED AND EXAMINED FOR PLAGUE.		Number of rats trapped in sugar refinery...	15
Collected.....	501	Number of rats examined.....	49
Found dead.....	1	Amount poison placed on Port Costa hills (pounds).....	8
Examined.....	306	RATS IDENTIFIED.	
Found infected.....	None.	<i>Mus norvegicus</i>	24
RATS IDENTIFIED.		<i>Mus musculus</i>	7
<i>Mus norvegicus</i>	237	<i>Mus alexandrinus</i>	18
<i>Mus musculus</i>	94	<i>Mus rattus</i>	

Record of plague infection.

Places in California.	Date of last case of human plague.	Date of last case of rat plague.	Date of last case of squir- rel plague.	Total number ro- dents found in- fected since May, 1907.
Cities:				
San Francisco.....	Jan. 30, 1908	Oct. 23, 1908	None.....	398 rats.
Oakland.....	Aug. 9, 1911	Dec. 1, 1908	do.....	126 rats.
Berkeley.....	Aug. 28, 1907	None.....	do.....	None.
Los Angeles.....	Aug. 11, 1908	do.....	Aug. 21, 1908	1 squirrel.
Counties:				
Alameda (exclusive of Oakland and Berkeley).....	Sept. 24, 1909	Oct. 17, 1909 (wood rat).	Aug. 7, 1914	286 squirrels, 1 wood rat.
Contra Costa.....	May 17, 1914	None.....	Aug. 25, 1914	1,563 squirrels.
Fresno.....	None.....	do.....	Oct. 27, 1911	1 squirrel
Merced.....	do.....	do.....	July 12, 1911	5 squirrels.
Monterey.....	do.....	do.....	Apr. 10, 1914	6 squirrels.
San Benito.....	June 4, 1913	do.....	July 3, 1914	35 squirrels.
San Joaquin.....	Sept. 18, 1911	do.....	Aug. 26, 1911	18 squirrels.
San Luis Obispo.....	None.....	do.....	Jan. 29, 1910	1 squirrel.
Santa Clara.....	Aug. 31, 1910	do.....	July 23, 1913	25 squirrels.
Santa Cruz.....	None.....	do.....	May 17, 1910	3 squirrels.
Stanislaus.....	do.....	do.....	June 2, 1911	13 squirrels.